BOBBY JINDAL
GOVERNOR

PEGGY M. HATCH
SECRETARY

State of Louisiana

DEPARTMENT OF ENVIRONMENTAL QUALITY
ENVIRONMENTAL SERVICES

Certified Mail No.

Agency Interest (AI) No. 126578
Activity No. PER20070012

Mr. David V. Wise
Shintech Louisiana, LLC
Plant Manager
PO Box 358
Addis, LA 70710-0358

RE: Prevention of Significant Deterioration (PSD) Permit, PSD-LA-739 Shintech Louisiana LLC - Shintech Plaquemine Plant Hydrochloric Acid Production Furnace 2
Shintech Louisiana LLC, Plaquemine Iberville Parish, Louisiana

Dear Mr. Wise:

Enclosed is your permit, PSD-LA-739. Construction of the proposed project is not allowed until such time as the corresponding Part 70 Operating Permit is issued.

Please be advised that pursuant to provisions of the Environmental Quality Act and the Administrative Procedure Act, the Department may initiate review of a permit during its term. However, before it takes any action to modify, suspend or revoke a permit, the Department shall, in accordance with applicable statutes and regulations, notify the permittee by mail of the facts or operational conduct that warrant the intended action and provide the permittee with the opportunity to demonstrate compliance with all lawful requirements for the retention of the effective permit.

Should you have any questions, contact Anthony Randall of the Air Permits Division at (225) 219-3130.

Sincerely,

Cheryl Sonnier Nolan
Assistant Secretary

____
Date

CSN:alr

c: US EPA Region VI

Agency Interest No. 126578

PSD-LA-739

AUTHORIZATION TO CONSTRUCT AND OPERATE A NEW FACILITY PURSUANT TO THE PREVENTION OF SIGNIFICANT DETERIORATION REGULATIONS IN LOUISIANA ENVIRONMENTAL REGULATORY CODE, LAC 33:III.509

In accordance with the provisions of the Louisiana Environmental Regulatory Code, LAC 33:III.509,

Shintech Louisiana LLC
PO Box 358
Addis, LA 707100358

is authorized to construct the Hydrochloric Acid Production Furnace 2 at the Shintech Louisiana LLC - Plaquemine PVC Plant near

26270 Hwy 405 River Road South
Plaquemine, Iberville Parish, Louisiana

subject to the emissions limitations, monitoring requirements, and other conditions set forth hereinafter.

This permit and authorization to construct shall expire at midnight on ______________, 2012, unless physical on site construction has begun by such date, or binding agreements or contractual obligations to undertake a program of construction of the source are entered into by such date.

Signed this ________ day of ________________, 2010.

Cheryl Sonnier Nolan
Assistant Secretary
Office of Environmental Services
Louisiana Department of Environmental Quality

BRIEFING SHEET

Hydrochloric Acid Production Furnace No. 2
Agency Interest No.: 126578
Shintech Louisiana LLC
Plaquemine, Iberville Parish, Louisiana
PSD-LA-739

PURPOSE

To obtain a PSD permit for the Shintech Plaquemine Plant Hydrochloric Acid Production Furnace 2 (HAPF-2)

RECOMMENDATION

Approval of the proposed construction and issuance of a permit.

REVIEWING AGENCY

Louisiana Department of Environmental Quality, Office of Environmental Services, Air Permits Division

PROJECT DESCRIPTION

The Shintech Plaquemine Plant 2 (SPP-2) will produce liquid by-products in the VCM unit. The by-product streams are considered waste streams classified as D001, K019, and K020 under the Resource Conversation and Recovery Act (RCRA) regulations 40 CFR 261. The liquid byproducts are rich in chlorine. To better manage the waste streams and provide HCl to the process, Shintech proposes to install HAPF, Emission Point Number (EPN) 2H-1, that will combust the waste and produce HCl and an HCl Storage Tank Scrubber, EPN 2H-2, that will support the HAPF. The construction and operation of the HAPF-2 are within the scope of the Shintech Plaquemine Plant 1 (SPP-1), Shintech Plaquemine Plant 2 (SPP-2), and Hydrochloric Acid Producion Furnace 1 (HAPF-1) projects, therefore the HAPF-2 is considered as part of the project.

Estimated emissions, in tons per year, are as follows:

Pollutant	Emission Increases				Net Changes	PSD Threshold	PSD Review Required
	SPP-1	SPP-2	HAPF-1	HAPF-2			
PM_{10}	78.04	27.74	6.04	6.04	+117.86	15	Yes
SO_2	3.53	2.72	0.01	0.01	+6.27	40	No
NO_X	95.10	44.15	2.49	2.49	+144.23	40	Yes
CO	212.78	179.45	15.17	15.17	+422.57	100	Yes
VOC	66.16	32.40	3.14	3.14	+104.86	N/A	No

TYPE OF REVIEW

Particulate matter (PM/PM_{10}), nitrogen oxide (NO_X), and carbon monoxide (CO) emissions from the proposed SPP-1, SPP-2, HAPF-1, and HAPF-2 will be above PSD significance levels. Therefore, the requested permit was reviewed in accordance with PSD regulations for PM/PM_{10}, NO_X and CO emissions. Emissions of LAC 33:III.Chapter 51-regulated toxic air pollutants (TAP) have been

BRIEFING SHEET

Hydrochloric Acid Production Furnace No. 2
Agency Interest No.: 126578
Shintech Louisiana LLC
Plaquemine, Iberville Parish, Louisiana
PSD-LA-739

reviewed pursuant to the requirements of the Louisiana Air Quality Regulations.

BEST AVAILABLE CONTROL TECHNOLOGY

PM/PM_{10}, NO_X, and CO emissions are above PSD significance levels and must undergo PSD analyses. The selection of control technology was based on the BACT analysis using a "top down" approach and included consideration of control of toxic materials.

Control of PM_{10} and CO emissions were analyzed using a "top down" approach. Good design and maintenance and good combustion practices were determined as BACT for PM_{10} and CO emissions from affected equipment at the proposed plant.

Shintech will utilize good combustion practices and selective catalytic reduction (SCR) to control NO_X emissions to a degree equivalent to the Lowest Achievable Emission Rates (LAER) to fulfill BACT requirements of the PSD program.

AIR QUALITY IMPACT ANALYSIS

Prevention of Significant Deterioration regulations require an analysis of existing air quality for those pollutants emitted in significant amounts from a proposed facility.

This modeling analysis was conducted for PM_{10}, CO, and NO_2. For those pollutants to be modeled, the impacts due to the contemporaneous net increase from the project (in this case, the entire allowable emission rates) were modeled to determine if the emissions increase results in a significant impact. Therefore the resulting concentrations were compared to corresponding modeling significance level (MSL) for each pollutant modeled and the corresponding average period.

Modeled concentrations of PM_{10}, CO and NO_2 for each averaging period were less than the MSL; therefore, a full impact analysis was not required.

ADDITIONAL IMPACTS

Soils, vegetation, and visibility will not be adversely impacted by the proposed facility, nor will any Class I area be affected. The project will not result in any significant secondary growth effects. Approximately 200 new permanent jobs will be created by the Shintech Plaquemine Plant.

PROCESSING TIME

Application Dated:	December 21, 2007
Application Received:	December 21, 2007
Effective Completeness Date:	March 4, 2010

BRIEFING SHEET

Hydrochloric Acid Production Furnace No. 2
Agency Interest No.: 126578
Shintech Louisiana LLC
Plaquemine, Iberville Parish, Louisiana
PSD-LA-739

<u>PUBLIC NOTICE</u>

A notice requesting public comment on the proposed project was published in *The Advocate*, Baton Rouge, Louisiana, on <<Date>>, 200x; and in <<*Local Paper*>>, <<City>>, Louisiana, on <<Date>>, 200x. Copies of the public notice were also mailed to individuals who have requested to be placed on the mailing list maintained by the Office of Environmental Services on <<Date>>, 200x. A proposed permit was also submitted to U.S. EPA Region VI on <<Date>>, 200x and to the Federal Land Manager on <<Date>>. All comments will be considered prior to a final permit decision.

PRELIMINARY DETERMINATION SUMMARY

Hydrochloric Acid Production Furnace No. 2
Agency Interest No.: 126578
Shintech Louisiana LLC
Plaquemine Iberville Parish, Louisiana
PSD-LA-739
March 4, 2010

I. APPLICANT

Shintech Louisiana LLC
PO Box 358
Addis, LA 70710-0358

II. LOCATION

Shintech Louisiana LLC – Hydrochloric Acid Production Furnace will be located at 26270 Hwy 405, Plaquemine, Louisiana. Approximate UTM coordinates are 675.55 kilometers East, 3348.26 kilometers North, zone 15.

III. PROJECT DESCRIPTION

The Shintech Plaquemine Plant 2 (SPP-2) will produce liquid by products in the VCM unit. The byproduct streams are considered waste streams classified as D001, K019, and K020 under the Resource Conversation and Recovery Act (RCRA) regulations 40 SFR 261. The liquid by-products are rich in chlorine. To better manage the waste streams and provide HCl to the process, Shintech proposes to install a Hydrochloric Acid Production Furnace (HAPF), Emission Point Number (EPN) 2H-1, that will combust the waste and produce HCl and an HCl Storage Tank Scrubber, EPN 2H-2, that will support the HAPF.

In the absence of HAPF-2, liquid byproducts from the VCM unit are sent to an off-site location for use as feedstock in other chemical processes or disposal. Upon completion of the HAPF-2 project , the liquid by-products will be sent to the HAPF to generate HCl. HCl generated by the HAPF will be combined with HCl flow recovered from the cracking process. Additionally, heat from the combustion of liquid by-products in the HAPF will be recovered by a waste heat boiler. Installation of the HAPF will form a closed-loop system, achieve maximum material and energy efficiency, and minimize waste generation.

Overview of the HAPF Process

As a waste treatment system, the HAPF-2 unit will consist of liquid waste storage tanks, a waste feed tank, a combustion chamber (i.e. the furnace), a waste heat boiler, a bubble cap tray acid absorber, a bubble cap tray caustic scrubber, a selective catalytic reduction system (SCR) for nitrogen oxides (NO_X) control, and an exhaust stack. The liquid waste storage tanks are included in PSD and Title V Permits for the SPP-2; therefore, these tanks are not included in this air permit.

The liquid waste from the distillation process will be stored in three tanks. The liquid waste will be pumped from one of the storage tanks to waste feed tank 2MTK-501, and fed to the furnace. The liquid waste will be combusted in the furnace and chlorinated organic compounds will be decomposed to form HCl. The flue gas from the furnace will pass through a heat recovery boiler before it enters a quencher. In the quencher, acid solution from downstream process vessels will be sprayed to the flue gas to cool it for absorption in the next stage of the process, which will be an HCl absorber. The HCl absorber is a bubble cap tray column where HCl in the HAPF flue gas will be captured as aqueous HCl. The rich aqueous HCl from the bottom of the absorber will be fed to an HCl stripper that reverses the absorption process and transfers HCl from aqueous solution into vapor phase for process use as feedstock in the VCM Unit. The lean solution from the bottom of the stripper will be returned to the absorber as absorbing solution, where it will absorb HCl gas to form rich solution. The rich solution can then be fed again to the stripper as a feed stock. With the majority of HCl in the exhaust removed in the absorber, the off-gas from the absorber will be directed to a caustic scrubber where residual HCl will be removed for the purpose of air pollution control. The cleaned off-gas will be routed through a Selective Catalytic Reduction (SCR) system to reduce NO_X before it is discharged to the atmosphere.

Waste Storage Tanks

Liquid waste generated during the Ethylene Dichloride (EDC) production process will be collected in the three storage tanks (2MTK-499A, 2MTK-499B, and 2MTK-496). The liquid waste storage tanks are constructed of carbon steel. The capacities of 2MTK-499A, 2MTK-499B, and 2MTK-496 are 50,000 gallons, 50,000 gallons and 300,000 gallons, respectively. The storage tanks are vented to vapor thermal oxidizers. These three storage tanks and the vapor thermal oxidizers are included in the SPP-2 air permit no. 3063-V0 issued July 10, 2008. The three storage tanks will meet all RCRA requirements. They will be used as <90-day waste storage tanks, as the waste will be shipped off site for disposal until air and RCRA permits are issued for the HAPF.

Tanks 2MTK-499A and 2MTK-499B will be used as primary storage tanks. Tank 2 MTK-496 will serve as a secondary storage tank and will be used as a surge tank for the two primary tanks. The liquid waste will be pumped from one of the storage tanks to the waste feed tank 2MTK-501, from which the liquid waste will be fed to the HAPF for combustion. A small portion (10-20%) of the discharges of these pumps will be returned to their respective tanks to keep the liquid in the tanks agitated and mixed. Mixing by recirculating a portion of the discharges to the tanks provides consistency within the waste stream, which minimizes variability of feed composition and probability of uncharacteristic waste surge.

PRELIMINARY DETERMINATION SUMMARY

Hydrochloric Acid Production Furnace No. 2
Agency Interest No.: 126578
Shintech Louisiana LLC
Plaquemine Iberville Parish, Louisiana
PSD-LA-739
March 4, 2010

Waste Feed System

Liquid waste feed will be hard piped from storage tanks to an 8,000 gallon feed tank (2MTK-501). When good combustion is established in the combustion chamber and prerequisite conditions for waste feed are met, the liquid waste is pumped at a pressure of 120 psig to the combuster via flow rate control valve. Approximately 10-20% of the feed pump discharge is redirected back to the feed tank. This small stream of recirculation keeps the waste in the feed tank agitated and well mixed. The majority of the feed pump discharge goes to the combustor. A block valve is also installed in the feed line for waste feed cutoff. The liquid waste is pumped into the combustion chamber through an injector gun with atomizing compressed air at a maximum rate of 7,000 lbs/hr. The atmozing air is supplied at a pressure of 100 psig. The waste injection rate is controlled by flowrate indicator and controller (FIC) with the "high" (H) limit established for maximum feed rate.

2MTK-501 will vent to the SPP-2 vapor thermal oxidizers in the same fashion as other vents from the process area. The vapor flow rate from the feed tank vent to the thermal oxidizers is expected to be negligible compared to the current total vapor flow to the thermal oxidizers, and the emissions from the thermal oxidizers are not expected to change due to adding the small feed tank vent.

Auxiliary Fuel Feed System

Auxiliary fuel is natural gas and will be used only for startup. Natural gas is used during the first 1 to 2 days of operation to pre-heat the unit. Natural gas is delivered via a flow rate control valve through a gas injector on the burner. The expected maximum heat release of the auxiliary fuel system will be 19.8 million British Thermal Units per hour (MM Btu/hr) for 24 hours during preheating.

Combustion Chamber

The HAPF-2 combustion chamber is designed based on proven technologies, successful installations, and long operating experience in other facilities including a facility operated by Shintech's parent company in Japan, which has been in operation for 35 years. The combustion chamber is a horizontal refractory lined vessel. It has a 31'-9" long carbon steel cylindrical shell with an outer diameter of 11'-2". The total volume of the combustion chamber is 1,500 cubic feet.

A vortex type burner is mounted on one end of the combustion chamber. The refractory lining consists of a high temperature refractory firebrick backed up by an insulating brick. The refractory lining is designed for a maximum operating temperature of 2,820 °F. The operating temperature will be kept constant at approximately 2,640 °F by regulating the excess air ratio. Excess air is monitored in the SCR inlet by QIA-O2 for which a low limit (L) is established for complete combustion. Operating temperature is monitored by three thermocouples placed at 27, 28, and 29 feet downstream from the tip of the burner. Combustion chamber temperature is represented by average values of three valid readings from the three thermocouples. An operating range for combustion chamber temperature will be established. If the combustion chamber temperature falls outside of the range, waste feed will automatically be cut off.

The combustion chamber will be operated at a positive pressure of 3-4 psig. The chamber itself has an integral carbon steel shell. All connections (e.g., the transition from the combustion chamber to the heat recovery boiler) will be sealed by gaskets designed for this type of application to prevent fugitive emissions from the combustion chamber. Leak checks will be conducted periodically to ensure the integrity of the seals.

Organics in the waste will be almost completely oxidized to form carbon dioxide (CO_2), water (H_2O), HCl, and a small amount of Cl_2. Low pressure steam will be added to the burner, as required, to reduce the formation of free Cl_2.

Combustion Air Supply

Combustion air is supplied to the combustion chamber by a blower. A flow control valve regulates the combustion air proportionally to keep a suitable excess air ratio. The combustion air enters the chamber at the burner windbox and passes through a set of directional vanes that impart a strong rotational (vortex) motion to the air. The vortex goes through a restriction at the inlet to the combustion chamber. Waste feed and natural gas are introduced into the center of the vortex.

Waste Heat Recovery Boiler

Combustion gas enters a waste heat recovery boiler to produce steam. The boiler is fabricated from carbon steel. It is a single pass, elevated drum, fire-tube boiler. It uses natural circulation with an external steam drum that provides a demisting device for vapor/liquid separation. A heat resistant cast lining is applied to the surface of the inlet tube sheet and ferrules are installed at each of the fire-tube inlets. A continuous blowdown device is provided for maintaining the quality both of the generated steam and water in the boiler. The pressure of the boiler is kept constant at 200 to 230 psig by regulating the amount of the boiler feed water.

The waste heat boiler has a steam generating capacity of 22,500 lbs/hr (10.2 metric tons/hr) and a heating duty of 23.9 MM Btu/hr.

The combustion gases enter the boiler at a temperature of approximately 2,640 °F and exit the boiler at a temperature approximately 660 °F. The combustion gas dwell time in the boiler section is approximately 0.5 seconds.

Quencher, Hydrochloric Acid Absorber, and Stripper

The liquid waste contains chlorinated organic compounds. Upon combustion, the chlorinated organic compounds will be decomposed and form CO_2 and H_2O as well as HCl. The system is designed to recover HCl. Capturing HCl is accomplished by unit operation of an absorber. The combustion gases exit from the waste heat boiler at a temperature of 660°F, which is too hot for gas absorption operation. In order to achieve effective HCl absorption, a quencher is used to cool the combustion gases before they enter the absorber.

The quencher is a vertical downflow, acid proof brick-lined, spray tower with a circulating liquid pump. Combustion gases enter from the top of the quencher and are cooled by direct contact with the circulating liquid, which is sprayed at the top of the quencher. The gases are quenched from 660°F to their saturation temperature of approximately 177 °F as they flow down through a set of spray contactors. The cooled gases exit the quencher from the bottom of the spray tower. The quencher design flow rate is 494,000 scfh (14,000 Nm^3/hr). Most of the non-volatile matter such as ferric chloride ($FeCl_3$) is caught in the quencher and discharged in the purge acid, which is drawn from the circulating liquid between the absorber and the stripper. Make-up liquid containing HCl is supplied via the absorber section.

The acid absorber is constructed of fiber reinforced plastic (FRP) and polyvinylidene difluoride (PVDF) plastic. The acid absorber is a bubble cap tray design. The gases from the quencher enter the absorber from the bottom of the absorption column, counter flow against absorbing liquid, and exit from the top of the column. HCl is absorbed by contact with lean acid from the HCl stripper and water on the bubble cap trays in the absorber column. Absorbing water is supplied at the top of the column. Almost all the HCl in the combustion gases is absorbed in the liquid as HCl solution. A part of the HCl solution is sent to the quencher as make-up liquid.

Rich acid is recovered from the bottom of the absorber and fed to a stripper as a feed stock. HCl is stripped in the stripping tower. HCl gas is produced at the top of the stripper. A condenser removes water from the HCl gas. The gas is pressurized by a gas compressor and is recovered as a product. Condensate is returned to the top of the stripper. The bottom solution of the stripper is returned to the absorber as absorbing solution that absorbs HCl gas to form a rich solution, which is fed again to the stripper as a feed stock.

The acid absorber has dual functions – it produces HCl for process use and it serves as an air pollution control device to remove acid from the flue gas.

Caustic Scrubber

A caustic scrubber is designed as an air pollution control device to remove residual HCl and other pollutants in the gas stream exiting from the acid absorber. Flue gases exit from the top of the absorber and directly enter the bubble cap tray caustic scrubber column. Constructed of FRP and PVDF, the scrubber is 38'-5" high with a diameter of 7'-10". Caustic soda and dilution water are supplied by flow rate control as scrubbing media to polish the flue gas cleanup and pick up most of the remaining chlorine and hydrochloric acid.

Reducing agent is also supplied by flow rate control to the scrubbing liquid to decompose sodium chlorite (NaClO), which is formed by a reaction between caustic soda and chlorine. Sodium chlorite needs to be removed because it may cause corrosion problem with the construction materials of the scrubber and downstream equipment.

Scrubbing water is drawn from the scrubber bottom and sent to the facility's wastewater treatment plant. After exiting the scrubber, the flue gases are passed through a demister where mist and condensed liquids are collected and removed.

SCR System

The SCR system is designed to remove approximately 90% of NO_X from the flue gas. The system consists of a gas heater, filter, and a de-NO_X catalyst bed. The flue gas from the caustic scrubber enters the gas heater, which by combining the flue gas with the gas heater combustion gases raises the temperature to approximately 350-430 °F—the catalyst working temperature.

The heated gas enters a filter to remove solids, such as sodium chloride, that may reduce catalyst activity. After the filter, aqueous ammonia solution is injected into the duct with atomizing air upstream of the SCR catalyst bed. The SCR catalyst is fixed on a cassette type ceramic structure. Ammonia is used as a reagent. Ammonia injection is controlled by regulating the aqueous ammonia feed rate to yield the desired ammonia to NO_X mole ratio. A continuous NO_X monitoring device at the outlet of SCR system, i.e. the exhaust stack, is used to regulate the aqueous ammonia injection rate.

Exhaust Stack

After the SCR, the cleaned flue gases are discharged into the atmosphere through an 82-foot tall free standing stack. The stack is cylindrical with an internal diameter of 31.5 inches. It is constructed of carbon steel.

Sampling ports will be installed on the stack at an elevation that is free of flow disturbance. There will be at least one pair of sampling ports, 90 degrees apart, and they will comply with EPA Method 1. Each sampling platform surrounding the stack will be constructed near the sampling ports. A ladder on the stack with a cage will provide sampling crew members to access the sampling platform.

A Sampling probe for CEMS will also be installed on the stack. A heated sampling line will convey the sample from the probe to the CEMS on the ground.

Estimated emissions, in tons per year, are as follows:

Pollutant	Emission Increases				Net Changes	PSD Threshold	PSD Review Required
	SPP-1	SPP-2	HAPF-1	HAPF-2			
PM_{10}	78.04	27.74	6.04	6.04	+117.86	15	Yes
SO_2	3.53	2.72	0.01	0.01	+6.27	40	No
NO_X	95.10	44.15	2.49	2.49	+144.23	40	Yes
CO	212.78	179.45	15.17	15.17	+422.57	100	Yes
VOC	66.16	32.40	3.14	3.14	+104.86	N/A	No

IV. SOURCE IMPACT ANALYSIS

A proposed net increase in the emission rate of a regulated pollutant above de minimis levels for new major or modified major stationary sources requires review under Prevention of Significant Deterioration regulations, 40 CFR 52.21. PSD review entails the following analyses:

A. A determination of the Best Available Control Technology (BACT);

B. An analysis of the existing air quality and a determination of whether or not preconstruction or postconstruction monitoring will be required;

PRELIMINARY DETERMINATION SUMMARY

Hydrochloric Acid Production Furnace No. 2
Agency Interest No.: 126578
Shintech Louisiana LLC
Plaquemine Iberville Parish, Louisiana
PSD-LA-739
March 4, 2010

C. An analysis of the source's impact on total air quality to ensure compliance with the National Ambient Air Quality Standards (NAAQS);

D. An analysis of the PSD increment consumption;

E. An analysis of the source related growth impacts;

F. An analysis of source related growth impacts on soils, vegetation, and visibility;

G. A Class I Area impact analysis; and

H. An analysis of the impact of toxic compound emissions.

A. BEST AVAILABLE CONTROL TECHNOLOGY

Under current PSD regulations, an analysis of "top down" BACT is required for the control of each regulated pollutant emitted from a modified major stationary source in excess of the specified significant emission rates. The top down approach to the BACT process involves determining the most stringent control technique available for a similar or identical source. If it can be shown that this level of control is infeasible based on technical, environmental, energy, and/or cost considerations, then it is rejected and the next most stringent level of control is determined and similarly evaluated. This process continues until a control level is arrived at which cannot be eliminated for any technical, environmental, or economic reason. A technically feasible control strategy is one that has been demonstrated to function efficiently on identical or similar processes. Additionally, BACT shall not result in emissions of any pollutant which would exceed any applicable standard under 40 CFR Parts 60 and 61.

For this project, BACT analyses are required for PM_{10}, NO_X and CO emissions from the facility. Where PM_{10} is addressed in the BACT analysis, it is assumed that particulate matter (PM) is also being considered.

BACT analyses for CO and PM10

Hydrochloric Acid Production Furnace EQT0182 (EPN 2H-1)

The HAPF-2 is used to produce HCl by the oxidation of chlorinated VOC from the EDC distillation columns. Byproducts of this combustion reaction are carbon dioxide and water. The HCl will be removed by an HCl absorber/scrubber. Thermal oxidation provides safe, effective, and efficient control of almost any organic stream, provided that it is properly designed and maintained.

The heart of the unit is a nozzle-stabilized flame maintained by waste liquid injection and supplemental air. Upon passing through the flame, the waste gas is heated from its inlet temperature to its ignition temperature. Any organic stream and air mixture will ignite if its temperature is raised to a sufficiently high level. Therefore the level of VOC control is determined by the residence time and temperature in the furnace combustion chamber.

Pollutants that can be expected from the HAPF-2 include products of combustion, i.e. PM_{10} and NO_X, and products of incomplete combustion, i.e. CO and VOC.

Particulate matter emissions from the furnace depend on the characteristics of the materials being combusted. Shintech will burn waste liquids from the EDC/VCM process.

The level of CO emissions is dependent on the efficiency of combustion. Furnaces that are poorly designed and/or maintained may have inefficient combustion resulting in higher CO emission rates. Sometimes NO_X control systems such as low NO_X burners (LNB) and flue gas circulation (FGR) may reduce combustion efficiency. Selective catalytic reduction (SCR) may result in higher ammonia emission rates.

EPS's RACT/BACT/LAER Clearinghouse (RBLC) was searched for permitted furnaces in similar industrial uses for the 2005 BACT analysis. Since 2005, no other more stringent BACT has been proposed. Based on the RBLC search results, the only technology for CO and PM control for similar sources is a scrubber/demister and good combustion practices.

Since the control technology represents the top performing method of controlling PM_{10} and CO emissions and there are no outstanding issues regarding collateral environmental impacts, Shintech will use the following as BACT.

Pollutant	Control Technology	Emission Limit
PM_{10}	Scrubber/Demister	0.021 gr/dscf
CO	Good Combustion	0.089 lb/MM BTU

These control options are determined as BACT.

<u>BACT analyses for NOx</u>

<u>HCl Production Furnace EQT0182 (EPN 2H-1)</u>

The HCl Production Furnace is used to produce hydrochloric acid (HCl) by the oxidation of chlorinated VOC from the EDC distillation columns. Byproducts of this combustion reaction are carbon dioxide and water. The HCl will be removed by an HCl absorber/scrubber. Thermal oxidation provides safe, effective, and efficient control of almost any organic stream, provided that it is properly designed and maintained.

PRELIMINARY DETERMINATION SUMMARY

Hydrochloric Acid Production Furnace No. 2
Agency Interest No.: 126578
Shintech Louisiana LLC
Plaquemine Iberville Parish, Louisiana
PSD-LA-739
March 4, 2010

The heart of the HCl Production Furnace is a nozzle-stabilized flame maintained by, waste liquid injection, and supplemental air. Upon passing through the flame, the waste liquid is heated from its inlet temperature to its temperature to its ignition temperature. Any organic stream and air mixture will ignite if its temperature is raised to a sufficiently high level. Therefore, the level of VOC control is determined by the residence time and temperature in the furnace combustion chamber.

Pollutants that can be expected from HCl Production Furnace include products of combustion, i.e. PM_{10} and NO_X, and products of incomplete combustion, i.e. CO and VOC.
EPA's RBLC was searched for permitted furnaces in similar industrial uses for the 2005 BACT analysis. The lowest permitted emission rates nationally are:

- 0.03 lb NO_X / MM Btu with LNB

Since 2005, no other more stringent emission rates have been proposed for this type of process. Shintech proposes to match or surpass the above emission rates with the following LAER:

- 0.0146 lb NO_X / MM Btu using good combustion practices and SCR

This control option is determined as BACT.

B. ANALYSIS OF EXISTING AIR QUALITY

Prevention of Significant Deterioration regulations require an analysis of existing air quality for those pollutants to be emitted in significant amounts from a proposed facility.

This modeling analysis was conducted for PM_{10}, CO, and NO_2. For those pollutants to be modeled, the impacts due to the contemporaneous net increase from the project (in this case, the entire allowable emission rates) were modeled to determine if the emissions increase results in a significant impact. Therefore the resulting concentrations were compared to corresponding modeling significance level (MSL) for each pollutant modeled and the corresponding average period.

Modeled concentrations of PM_{10}, CO and NO_2 for each averaging period were less than the MSL; therefore, a full impact analysis was not required.

As per LAC33:III.5109.B.2.a-c, the modeling effort shows that Shintech's facility will not adversely impact the ambient air quality.

PRELIMINARY DETERMINATION SUMMARY

Hydrochloric Acid Production Furnace No. 2
Agency Interest No.: 126578
Shintech Louisiana LLC
Plaquemine Iberville Parish, Louisiana
PSD-LA-739
March 4, 2010

C. NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS) ANALYSIS

Refined modeling was not required.

D. PSD INCREMENT ANALYSIS

Computer modeling was not required.

E. SOURCE RELATED GROWTH IMPACTS

Operation of this facility is not expected to have any significant effect on residential growth or industrial/commercial development in the area of the facility. No significant net change in employment, population, or housing will be associated with the project. As a result, there will not be any significant increases in pollutant emissions indirectly associated with Shintech Louisiana LLC's proposal. Secondary growth effects will include temporary construction related jobs and approximately 200 permanent jobs.

F. SOILS, VEGETATION, AND VISIBILITY IMPACTS

There will be no significant impact on area soils, vegetation, or visibility.

G. CLASS I AREA IMPACTS

Louisiana's Breton Wildlife Refuge, the nearest Class I area, is over 100 kilometers from the site, precluding any significant impact.

H. TOXIC EMISSIONS IMPACT

The selection of control technology based on the BACT analysis included consideration of control of toxic emissions.

V. CONCLUSION

The Air Permits Division has made a preliminary determination to approve the construction of the facility at the Shintech Louisiana LLC - Plaquemine PVC Plant near Plaquemine in Iberville Parish, Louisiana, subject to the attached specific and general conditions. In the event of a discrepancy in the provisions found in the application and those in this Preliminary Determination Summary, the Preliminary Determination Summary shall prevail.

SPECIFIC CONDITIONS

Hydrochloric Acid Production Furnace No. 2
Agency Interest No.: 126578
Shintech Louisiana LLC
Plaquemine Iberville Parish, Louisiana
PSD-LA-739

1. Comply with the Louisiana General Conditions as set forth in LAC 33:III.537. [LAC 33:III.537]

2. The permittee is authorized to operate in conformity with the specifications submitted to the Louisiana Department of Environmental Quality (LDEQ) as analyzed in LDEQ's document entitled "Preliminary Determination Summary" dated March 4, 2010 and subject to the following emissions limitations and other specified conditions. Specifications submitted are contained in the application and Emission Inventory Questionnaire dated December 21, 2007.

MAXIMUM ALLOWABLE EMISSIONS RATES

ID No.	Description		PM_{10}	NO_X	CO
EQT0182	2H-1 Hydrochloric Acid Production Furnace	lb/MM Btu		0.0146	0.089
		gr/dscf	0.021		
		lb/hr	1.65	0.68	4.16
		TPY	6.04	2.49	15.17

BACT DETERMINATION

Pollutant	Control Technology	Emission Rate
PM_{10}	Scrubber/Demister	0.021 gr/dsf
CO	Good Combustion	0.089 lb/MM BTU
NO_X	SCR	0.0146 lb/MM BTU

TABLE I: BACT COST SUMMARY

Hydrochloric Acid Production Furnace No. 2
Agency Interest No.: 126578
Shintech Louisiana LLC
Plaquemine Iberville Parish, Louisiana
PSD-LA-739

Control Alternatives		Availability/ Feasibility	Negative Impacts (a)	Control Efficiency	Emissions Reduction (TPY)	Capital Cost ($)	Annualized Cost ($)	Cost Effectiveness ($/ton)	Notes
	(N/A)[1]								
Notes:	a) Negative impacts: 1) economic, 2) environmental, 3) energy, 4) safety								

[1] Technologies were not eliminated based on economics.

TABLE II: AIR QUALITY ANALYSIS SUMMARY

Hydrochloric Acid Production Furnace No. 2
Agency Interest No.: 126578
Shintech Louisiana LLC
Plaquemine Iberville Parish, Louisiana
PSD-LA-739

Pollutant	Averaging Period	Preliminary Screening Concentration ($\mu g/m^3$)	Level of Significant Impact ($\mu g/m^3$)	Significant Monitoring Concentration ($\mu g/m^3$)	Background ($\mu g/m^3$)	Maximum Modeled Concentration ($\mu g/m^3$)	Modeled + Background Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Modeled PSD Increment Consumption ($\mu g/m^3$)	Allowable Class II PSD Increment ($\mu g/m^3$)
PM_{10}	24-hour	3.72	5	10	NR	NR	NR	150	NR	30
NO_X	Annual	0.75	1	14	NR	NR	NR	100	NR	25
CO	1-hour	226.95	2000	-	NR	NR	NR	40,000	NR	-
	8-hour	105.01	500	575	NR	NR	NR	10,000	NR	-

NR = Not required.